PHYSICS II

023

08:00AM-11:00AM

2nd TERM

REPUBLIC OF RWANDA

KAYONZA DISTRICT

ADVANCED LEVEL DISTRICT ASSESSMENT, 2024

SUBJECT: PHYSICS II

Class: S6: -PHYSICS-CHEMISTRY-BIOLOGY(PCB)

-PHYSICS-CHEMISTRY-MATHEMATICS(PCM)

- MATHEMATICS-PHYSICS-GEOGRAPHY(MPG)

-MATHEMATICS-PHYSICS-COMPUTER(MPC)

- ASSOCIATED NURSING PROGRAM

DURATION: 3HOURS

END TERM II PHYSICS THEORY ASSESSMENT

Instructions

This paper is composed by **20** questions and is divided into two sections **A** and **B**.

Section **A** of **15** questions on **70** marks in total

Section **B** of 5 questions on **30** marks in total

SECTION A

MULTIPLE-CHOICE QUESTIONS EACH QUESTION IS ASSIGNED BY **(4marks)**

Choice the best answer in the questions below from question one up toquestion ten

MULTIPLE-CHOICE QUESTIONS

Q1. A. Which of the following properties of a sound wave determines its pitch?

i) Amplitude (ii) Wavelength

(iii) Frequency (iv) Speed

B. In which medium does sound travel the fastest?

(i) Air (ii) Water

(iii) Steel (iv) Vacuum

Q2. A. Which One of the Following Is Not a Greenhouse Gas?

Methane Nitrous oxide

Hydrogen Ozone

B. Reducing the amount of future climate change is called:

Mitigation ii) Adaptation (iv)None of these

Geoengineering

Q3. A. In which layer of the atmosphere does ozone act as a UV radiation shield?

i) Troposphere Stratosphere

Thermosphere iv) Mesosphere

B. Agrophysics is defined as

The branch of science deals with the study of matter and energy and their mutual relation.

The branch of science deals with communication devices to measure and collect information about physical conditions in agricultural and natural environments.

The branch of natural sciences dealing with the application of physics in agriculture and the environment.

None of these

Q4. A. The Doppler Effect is observed when:

i) a sound source moves relative to an observer ii) a sound source and an observer move towards each other

iii) a sound source and an observer move away from each other iv) all of the above

B. The decay constant of a radioactive substance determines:

i) the amount of time it takes for half of the atoms in a sample to decay ii) the energy released during decay iii) the type of radiation emitted iv) the mass of the decay products

Q5. A. When an alpha particle is emitted from an unstable nucleus, the atomic mass number of the nucleus

increases by 2.

ii.) decreases by 2.

increases by 4.

decreases by 4.

none of the above.

B. If $4.0X10^{18}$ atoms decay with a half-life of 2.3 years, how many are remaining

after 3.7 years?

i. $2.5X10^{18}$ iii. $1.3X10^{18}$

ii. $1.7X10^{18}$ iv. $1.1X10^{18}$

Q6. A. In the structure of fiber optic cable, the refractive index of the core is always__the refractive index of the cladding.

Less than Greater than

Equal to None of the above

B. Which among the following is/are responsible for generating attenuation of optical power in fiber?

i)Absorption Waveguide effect

Scattering All of the above

Q7. A. In amplitude modulation, the of carrier is varied according to the strength of the signal

i) amplitude
ii). Frequency
Phase
None of the above

B. In radio transmission, the medium of transmission.....

Space
Cable
an antenna
None of the above

Q8. A. The gluon is the force carrier for

weak force
stronger force
Gravity
electromagnetic force
The fifth force

B. What are the fundamental particles of an atom?i). Quarks, gluons, and electrons

Protons, neutrons and electrons

The nucleus and electron orbit

An atom cannot be broken down into anything small than itself.

Q9. A. Is it possible for a particle to be both?

i) a lepton and a baryon? ii). a meson and a quark?
iii). a baryon and a hadron?
iv) a hadron and a lepton

B. Electrons are still considered fundamental particles (in the group called leptons). But protons and neutrons are no longer considered fundamental; theyhave substructure and are made up of

pions.
photons
quarks
bosons

Q10. A. Type of x-rays used to detect broken bone is

hard
iii). both A and Biv). Moderate
soft

B. The number of neutrons in a nucleus of gold whose symbol is $^{197}_{79}Au$ is:

i) 79 ii) 118

197 iv) 276

STRUCTURED QUESTION

Q11.a) What are X-rays? **(2marks)**

b) What are the main properties of X-rays? **(2marks)**

Q12 a) What do you understand by antiparticle? **(2marks)**

State Pauli's exclusion principle? **(2marks)**

Why Pauli's exclusion Principle is known as exclusion **(2marks)**

Q13. (a) What does the term transducer mean in a communication system?

(1mark)

(b) Recently, the government of Rwanda decided to replace the analog system ofcommunication with a digital system of communication. evaluate this government policy **(4marks)**

Q14. (a) List two optical parties of optical fiber **(2marks)**

(b) Compare mono-mode type with multi-mode types of fiber optics **(6marks)**
Q15. (a) What is meant by the term "Doppler 'effect" **(2marks)**

(b) As an ambulance travels east down a highway at a speed of 33.5 m/s, itssiren emits sound at a frequency of 400 Hz. What frequency is heard by a person in a car traveling west at 54.6 m/s

As the car approaches the ambulance. **(2.5marks)**

As the car moves away from the ambulance? **(2.5marks)**

SECTION B

Attempt any three questions

Q16 (a) What do you understand by the term climate change **(1mark)**

(b)explain how greenhouse gases contribute to climate change. **(2maks)**

(c)Explain how humans can affect land surface albedos. **(2marks)**

(d)Explain how the loss of land vegetation might modify local climates.

(2maks)

(e)What impact have humans had on concentrations of greenhouse gases? Give a specific example**(1mark)**

Evaluate the extent to which Rwanda is being affected by climate change.

(2marks)

17 (a) Describe how sound waves travel through different mediums. **(3marks)**
(b) Explain why sound travels faster in solids than in gases. **(3marks)**
(c) How does temperature affect the speed of sound in air? Provide an explanation. **(4marks)**

Q18. (a) Explain the classification of fundamental particles on the bases of spin. **(4marks)**

(b) A student claims to have observed a decay of an electron into two neutrinos, traveling in opposite directions. What conservation laws would be violated by this decay? **(6marks)**

19.(a) what is agrophysics **(2marks)**

(b) briefly explain the Significance of physics in agricultural sciences. **(8marks)**

Q20. (a) Define the term half-life period and decay constant of a radioactive substance and write down their S I units **(4marks)**

The decay constant of a radioactive substance is 0.693 per minute. What will be the half-life and mean life of it? **(4marks)**

Establish the relationship between the term half-life period and decay constant **(2marks)**

END!!!!!!!!!!!!!!!!!!!!!